

REMARKS

Reconsideration of the above-identified patent application is respectfully requested.

Claims 1, 5, 7, 8-10, and 15-18 stand rejected under 35 U.S.C. § 102(a), (b), and (e) as being anticipated by U.S. Patent No. 4,981,353 to Murakawa et al. (Murakawa). Claims 4, 6, 11, 12, 19, and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Murakawa. Claims 1-26 also stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,094,625 to Ralston (Ralston), U.S. Patent No. 5,929,807 to Viney et al. (Viney), U.S. Patent No. 5,671,160 to Julian (Julian), U.S. Patent No. 5,528,518 to Bradshaw et al. (Bradshaw), U.S. Patent No. 5,337,149 to Kozah et al. (Kozah), U.S. Patent No. 4,295,201 to Wiklund (Wiklund), or U.S. Patent No. 6,473,716 to Ohishi et al. (Ohishi).

Amended Claim 1

Claim 1 has been amended to recite:

1. A survey device for determining an elevation of a subterranean architectural feature located in a subterranean chamber, the survey device comprising:

a support frame having a cross bar configured to span an access opening of the subterranean chamber, the cross bar having a first end configured to contact a first portion of a rim of the access opening and a second end configured to contact a second portion of the rim,

a first sensor coupled to the support frame and operable to generate a first signal indicative of a line-of-sight distance from the survey device to the subterranean architectural feature located in the subterranean chamber,

a second sensor coupled to the support frame and operable to generate a second signal indicative of an angular position of the survey device relative to a vertical reference, and

a processor electrically coupled to both the first sensor and the second sensor.

As such, the invention of claim 1 defines a survey device that is operable to quickly and easily determine the elevation of a subterranean architectural feature, such as a pipe, that is located in a subterranean chamber. The subterranean chamber may be, for example, a sewer

collection chamber or other subterranean chamber. Access to such a subterranean chamber is generally restricted to one or more access openings such as a typical "man-hole" opening. Determining the location of the subterranean architectural feature typically requires that the survey device be positioned over the access opening and aimed at the subterranean architectural feature through the access opening. Typical uses of the survey device of claim 1 include the quick and accurate collection of "as-built" measurements for verifying the location of subterranean architectural features according to a building plan and the like.

By contrast, a typical surveying device is severely inefficient and, in many, if not most, cases, incapable of determining the elevation of a subterranean architectural feature that is located in a subterranean chamber. This is because typical surveying devices do not possess the degree of rotational freedom required to aim the device at the subterranean architectural feature through the access opening. Typical surveying devices have only a limited angle of rotation because such devices are designed for use at great distances from the object of interest. This inadequacy of typical surveying devices would only be exacerbated if the device was to be positioned over the access opening. Indeed, if such typical surveying device was positioned over the access opening, a greater degree of rotational freedom would be required to aim the device through the access opening.

Further, typical surveying devices are mounted on tripods. Such a tripod only increases the inadequacy of typical surveying devices to locate subterranean features because such support structures elevate the surveying device above the access opening thereby significantly restricting the line-of-sight range of the device. For example, the line-of-sight of a typical surveying device may be obstructed by the tripod or other support structure when the device is directed downwardly toward the access opening. In addition, typical surveying devices require that the

device be perfectly, or near perfectly, level and often require a stabilization time period in which the device attempts to self-level. If the device cannot successfully self-level, the device will not turn on or otherwise will not perform the desired measurements. Even if the device successfully self-levels, such a process can often take several minutes to accomplish. Such limitations of the typical surveying device make such devices inadequate for determining the elevation of a subterranean architectural feature located in a subterranean chamber.

35 U.S.C. §102, §103 Rejections - Murakawa

Turning now to the specific references cited by the Examiner, the Examiner rejected claims 1, 5, 7, 8-10, and 15-18 under 35 U.S.C. §102(a), (b), and (e) as being anticipated by Murakawa and claims 4, 6, 11, 12, 19, and 21 as being unpatentable over Murakawa. Murakawa discloses an apparatus "for detecting the position of an underwater moving body loaded with an inspecting device." (See Abstract). Murakawa fails to anticipate amended claim 1 because Murakawa fails to disclose or show "a support frame having a cross bar configured to span an access opening of a subterranean chamber," as recited in amended claim 1.

Furthermore, Murakawa fails to render obvious amended claims 7, 11, 15, 19, and 23. Specifically, Murakawa does not arrive at the invention of claims 7, 11, 15, 19, and 23 since Murakawa fails to teach or suggest "a support frame having a cross bar configured to span an access opening of a subterranean chamber" as recited in amended claims 11 and 19. Murakawa also fails to teach or suggest "positioning the survey instrument over an access opening of the subterranean chamber" and/or "aiming the survey instrument through the access opening of the subterranean chamber and toward the subterranean architectural feature" as recited in amended claims 7, 15, and 23.

For at least the reasons provided above, Murakawa does not anticipate nor render obvious claims 1, 7, 11, 15, 19, or 23 and, as such, these claims are believed to be allowable. Because claims 2-6, 8-10, 12-14, 16-18, 20-22, and 24-26 depended from claims 1, 7, 11, 15, 19 and 23, respectively, these claims are also believed to be in condition for allowance.

35 U.S.C. §103 Rejections - Ralston

In regard to Ralston, this reference does not arrive at Applicant's invention because it fails to teach or suggest a survey instrument having "a support frame having a cross bar configured to span an access opening of a subterranean chamber," as recited in amended claims 1, 11, and 19. In addition, Ralston fails to provide any motivation to modify the apparatus disclosed therein to include such a support frame. Further, Ralston does not arrive at Applicant's invention because it fails to teach or suggest a method of operating a survey device to determine an elevation of a subterranean architectural feature located in a subterranean chamber including the steps of "positioning the survey instrument over an access opening of the subterranean chamber" and "aiming the survey instrument through the access opening of the subterranean chamber and toward the subterranean architectural feature," as recited in claims 7, 15, and 23. Ralston also fails to provide any motivation to modify the methods disclosed therein to arrive at the operating methods claimed in claims 7, 15, and 23.

Accordingly, for at least the reasons provided above, Ralston fails to render any of amended claims 1, 7, 11, 15, 19, or 23 obvious and, as such, these claims are believed to be in condition for allowance. Because claims 2-6, 8-10, 12-14, 16-18, 20-22, and 24-26 depended from claims 1, 7, 11, 15, 19 and 23, respectively, these claims are also believed to be in condition for allowance.

35 U.S.C. §103 Rejections - Viney

In regard to Viney, this reference does not arrive at Applicant's invention because it fails to teach or suggest a survey instrument including "a support frame having a cross bar configured to span an access opening of a subterranean chamber," as recited in amended claims 1, 11, and 19. In addition, Viney does not arrive at Applicant's invention because it fails to teach or suggest a survey instrument having "a first sensor coupled to the support frame and operable to generate a first signal indicative of a line-of-sight distance from the survey device to the subterranean architectural feature located in the subterranean chamber," as recited in amended claim 1, nor "a distance sensor coupled to the support frame," as recited in amended claims 11 and 19. Further, Viney fails to teach or suggest a method of operating a survey device to determine an elevation of a subterranean architectural feature located in a subterranean chamber including the steps of "positioning the survey instrument over an access opening of the subterranean chamber" and "aiming the survey instrument through the access opening of the subterranean chamber and toward the subterranean architectural feature," as recited in claims 7, 15, and 23.

Accordingly, for at least the reasons provided above, Viney fails to render any of amended claims 1, 7, 11, 15, 19, or 23 obvious and, as such, these claims are believed to be in condition for allowance. Because claims 2-6, 8-10, 12-14, 16-18, 20-22, and 24-26 depended from claims 1, 7, 11, 15, 19 and 23, respectively, these claims are also believed to be in condition for allowance.

35 U.S.C. §103 Rejections - Bradshaw

In regard to Bradshaw, this also does not arrive at Applicant's invention because it fails to teach or suggest a survey instrument having "a support frame having a cross bar configured to span an access opening of a subterranean chamber," as recited in amended claims 1, 11, and 19. In addition, Bradshaw does not arrive at Applicant's invention because it fails to teach or suggest a method of operating a survey device to determine an elevation of a subterranean architectural feature located in a subterranean chamber including the steps of "positioning the survey instrument over an access opening of the subterranean chamber" and "aiming the survey instrument through the access opening of the subterranean chamber and toward the subterranean architectural feature," as recited in claims 7, 15, and 23.

Accordingly, for at least the reasons provided above, Bradshaw fails to render any of amended claims 1, 7, 11, 15, 19, or 23 obvious and, as such, these claims are believed to be in condition for allowance. Because claims 2-6, 8-10, 12-14, 16-18, 20-22, and 24-26 depended from claims 1, 7, 11, 15, 19 and 23, respectively, these claims are also believed to be in condition for allowance.

35 U.S.C. §103 Rejections - Julian, Kozah, Wiklund, and Ohishi

In regard to Julian, Kozah, Wiklund, and Ohishi, each of these references discloses a typical surveying device that includes a tripod. As such, none of these references arrive at Applicant's invention because each fails to teach or suggest a survey instrument having "a support frame having a cross bar configured to span an access opening of a subterranean chamber," as recited in amended claims 1, 11, and 19. In addition, neither Julian, Kozah, Wiklund, nor Ohishi arrive at Applicant's invention because each fails to teach or suggest a method of operating a survey device to determine an elevation of a subterranean architectural

feature located in a subterranean chamber including the steps of "positioning the survey instrument over an access opening of the subterranean chamber" and "aiming the survey instrument through the access opening of the subterranean chamber and toward the subterranean architectural feature," as recited in claims 7, 15, and 23. Further, all the arguments provided above in regard to typical survey devices apply with equal force to each of these references.

Accordingly, for at least the reasons provided above, neither Julian, Kozah, Wiklund, nor Ohishi render any of amended claims 1, 7, 11, 15, 19, or 23 obvious and, as such, these claims are believed to be in condition for allowance. Because claims 2-6, 8-10, 12-14, 16-18, 20-22, and 24-26 depended from claims 1, 7, 11, 15, 19 and 23, respectively, these claims are also believed to be in condition for allowance.

Claims 1, 7, 11, 15, 19, and 23 have been amended and are believed to be in condition for allowance. Claims 3, 4, 8, 14, 16, 22, and 22 have been amended for consistency. Claims 1-26 are accordingly believed to be in condition for allowance, and such action is solicited.

It is respectfully requested that, if necessary to effect a timely response, this paper be considered as a Petition for an Extension of Time sufficient to effect a timely response and shortages in other fees be charged, or any overpayment in fees be credited, to the Account of Barnes & Thornburg, Deposit Account No. 10-0435 with reference to file 20327-72849.

Respectfully submitted,



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